

## *Eptatretus eos*: A New Species of Hagfish (Myxinidae) from the Tasman Sea

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**Abstract** A new species of hagfish (Myxinidae), *Eptatretus eos*, is described on the basis of one specimen from the Tasman Sea, west of New Zealand. This five-gilled, deep-sea species differs from previously described hagfish in having the unpaired nostril prolonged into a tube-like snout and in being uniformly pink.

In the trawl fishery for the holacanthid fish *Hoplostethus atlanticus* around New Zealand, a single, slightly damaged specimen of hagfish was collected. It was brought to the National Museum of New Zealand in Wellington and attracted attention because of its pink color. On close examination it turned out to be a new species of hagfish with unique specializations in the snout region.

An alert was put out to scientists and fisheries observers in the area to try to acquire more specimens for a description of the new species. After more than a year without any additional specimens appearing I decided to describe and name the species.

### Material and methods

The new species reported herein was caught by trawl on Westpack bank, Western Challenger Plateau, Tasman Sea, W of New Zealand. The only known specimen is kept in the National Museum of New Zealand, Wellington (NMNZ).

Counts and measurements were made in the same manner as in Fernholm and Hubbs (1981). Gill pouches were counted through a midventral cut in the branchial area. Counting of teeth was simplified by making another midventral cut in the mouth to expose the tooth plates. Total cusp count was obtained by adding the number of cusps on multicuspid to the number of unicuspid (including the smaller ones) on both the inner and outer tooth rows on each of the left and right tooth plates.

*Eptatretus eos*, sp. nov.  
(Fig. 1)

**Holotype.** NMNZ P 24262. 665 mm TL, female caught by trawl 19 July, 1989. Tasman Sea, 39°47.7–50.3'S, 167°15.7–13.5'E, depth 991–1,013 m. "Explorer" AE 1/105/89.

**Name.** The specific name of *E. eos* refers to its pink color; after the goddess of morning-glow, *Eos*.

**Diagnosis.** A five-gilled species of *Eptatretus* distinguished from all other myxinid species by a tube-shaped elongated snout. Total cusp count 34. Total slime pores on one side 128–130, including 27 in a caudal series.

**Description.** Body cylindrical throughout most of its length, its diameter about 30 mm, tapering rearward, laterally compressed behind the cloaca forming a tail; total length of the studied specimen 665 mm; a segmentally arranged row of 128–130 slime pores low on each side, extending from behind the head to beyond the cloaca, 26 pores in front of the gill apertures, three (left side) and one (right side) (in intact specimens probably 4–5) pores in the gill aperture region, 75–77 between the gill apertures and the cloaca, and 26–27 overlying and posterior to the cloaca.

Prebranchial length from snout to gill apertures 156 mm (23.5% of TL), branchial length (measurement partly deduced because of damage in the branchial region) from front of first gill aperture on the left side to front of the pharyngocutaneous opening 31 mm (4.7% of TL), trunk length from front of pharyngo-cutaneous duct opening to front of cloacal split 358 mm (54% of TL), and tail from front of cloacal split to posterior tip of caudal fin 120 mm

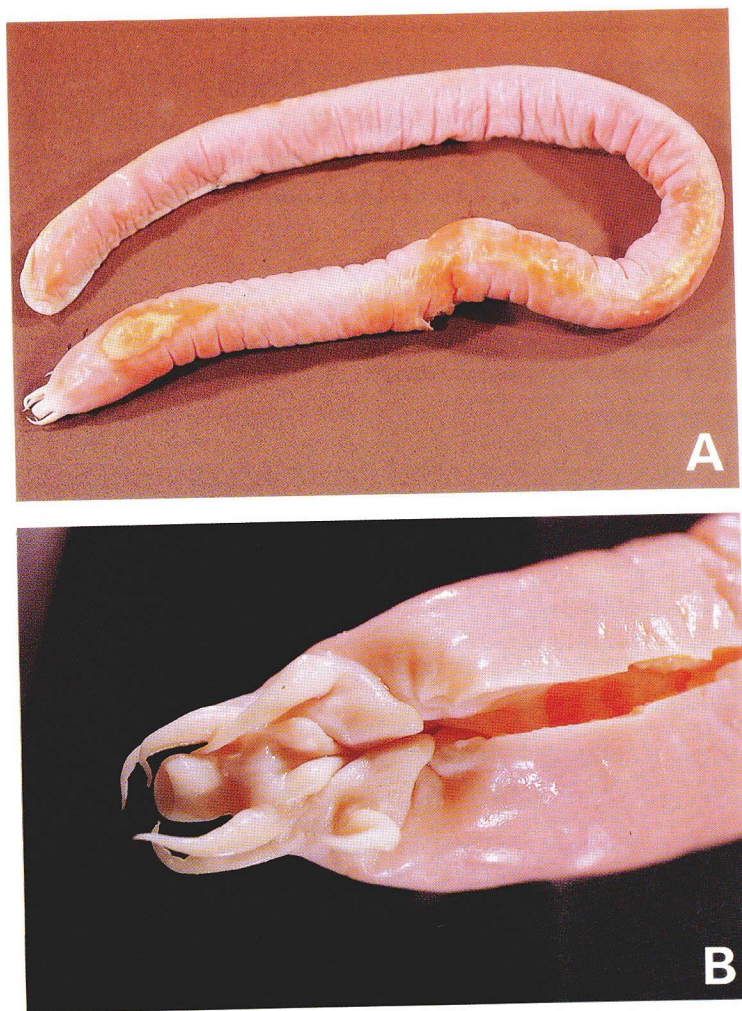


Fig. 1. Holotype of *Eptatretus eos*, NMNZ P 24262. A: Dorsal view showing general outline, pink coloration and orange-red patches (fixation artifact) on the back. B: Ventral view with close up of mouth (cut to permit tooth count). Note tube-like snout.

(18% of TL); the single nostril elongated, tube-like, 6.3 mm long and 5.4 mm outside circumference with inner opening  $3.6 \times 2.3$  mm; two pairs of slender, flexible barbels flanking either side of nostril extending to about 5 mm in front of the tip of the nostril with a third somewhat longer pair (13.9 mm) reaching forward to the tip of the nostril; mouth without lips; five gill pouches on each side; only four gill openings on the left side and one on the right side could be observed because of superficial damage to the gill region.

Lingual teeth orange, comb-like, with sharp tips slightly curved rearward, close together, with longest

teeth in the middle of each row, decreasing in length to both sides; those of outer series larger than those of inner series and partially overlapping the latter when tongue is retracted within mouth; six unicuspid on either side in the outer row, six to the left and five to the right in the inner row; outer rows start with a multicusp with three fused unicusps; inner rows start with multicusps with two (left) and three (right) fused unicusps.

Four apertures on the left and one on the right can be seen in the damaged branchial region. Presumably the five interior gills have one aperture each with the left posteriormost aperture being enlarged and

common for the gill and pharyngocutaneous duct.

The cloacal aperture is a 10 mm long longitudinal slit surrounded by lateral folds. A caudal finfold originates dorsally halfway between the cloaca and the posterior tip, and continues caudally around the tip and ventrally forward to the posterior end of the cloacal aperture. In front of the cloaca is an inconspicuous finfold continuing rostrad halfway to the branchial region.

The preserved specimen is light pink all over except for some dorsal darker orange patches and the mouth and nostril which are white. There are lighter lines following the ventral rows of slime pores and gill apertures. Some color has been lost in preservation judging from slides taken at the time of capture and in December 1989.

### Discussion

It is regrettable that this description has to be based on only one specimen, but since hagfish are only very rarely caught in the trawl fishery it may be long before another specimen is found. However, the specific characteristics of *E. eos* make it easy to distinguish and the diagnosis is distinct and straightforward.

Hagfishes spend most of their time on the bottom. In shallower water they are mainly found swimming at night (Fernholm, 1974). At a depth of 1,000 m, where *E. eos* is found, such diurnal activity is not likely to occur. It is not possible to determine whether the animal was caught when free-swimming or when the trawl happened to dig into the bottom.

Strahan (1975) reviewed the 5–7 gilled eptatretid hagfishes, *E. longipinnis*, *E. cirrhatus*, *E. burgeri*, *E. hexatrema*, *E. atami*, *E. yangi*, *E. profundus* and *E. springeri*. Since then, several additional 5–7 gilled species have been described: *E. multidentis*, *E. minor* (Fernholm and Hubbs, 1981), *E. caribbeaus* (Fernholm, 1982), *E. carlhubbsi*, *E. laurahubbsae*, *E. strahani* (McMillan and Wisner, 1984) and *E. mendozai* (Hensley, 1985). A comparison with these 15 species reveals that *E. eos* is unique in several characters or falls outside the combined range for the former. Most conspicuous is the unique tube-shaped single nostril in *E. eos*. The counts for total cusps are below and the count for total slime pores above those of other species. The caudal slime pore count is at least 10 more for *E. eos* than for even the most gigantic of the previously described species.

The elongate snout is difficult to explain. The only

hagfish species that has been studied in any detail in its natural habitat, the Japanese *E. burgeri* (Fernholm, 1974), spends most of its time buried in bottom mud. *Eptatretus burgeri* has a typical hagfish nostril with a broad, short dorsal rostrum forming the extreme anterior median part of the body. If *E. eos* likewise spends time in bottom mud, a prolonged snout would make it possible for the animal to have its body 5 mm deeper in the mud. However, trying to explain this as an adaptive advantage leads too far into speculation.

Hagfishes in general are different shades of brownish, blackish or light pink, where the pink coloration is due mainly to a transparent skin through which the color of the blood can be seen. The live color of *E. eos* is conspicuously pink, resulting from skin pigments. It is tempting to speculate that this may be caused by a diet dominated by the similarly colored orange roughy, *Hoplostethus atlanticus*, which obviously is most plentiful, supporting a major fishery at the type locality.

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タスマン海から得られたヌタウナギの1新種

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ニュージーランド西方のタスマン海から採集された珍稀な1標本に基づいて、ヌタウナギ科の新種 *Eptatretus eos* を記載した。

本種は、5対の鰓孔をもつ深海性(約 1,000 m)の種であるが、既知のヌタウナギ属の種とは、次の諸点で大いに異なっている。すなわち、著しく伸長した管状の吻の中に1個の鼻孔が開いていることと、体色が一様に桃色であることで、種小名は体色に由来して与えた。